

**SYNTHESIS, CHARACTERIZATION AND CONTROLLED  
RELEASE PROPERTIES OF MAGNESIUM ALUMINIUM  
LAYERED DOUBLE HYDROXIDE  
4-CHLOROPHENOXYACETIC  
ACID NANOCOMPOSITE**

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Partial Fulfillment of the Requirements for the  
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This Final Year Project entitled **Synthesis, Characterization And Controlled Release Properties Of Magnesium Aluminium Layered Double Hydroxide 4-Chlorophenoxyacetic Acid Nanocomposite**” was submitted by Nur Suhana binti Mohd Ali, in partial fulfilment of the requirement for the Degree of Bachelor of Science (Hons.) Chemistry, in faculty of Applied Sciences, and was approved.

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## ABTRACT

### **SYNTHESIS, CHARACTERIZATION AND CONTROLLED RELEASE PROPERTIES OF MAGNESIUM ALUMINIUM LAYERED DOUBLE HYDROXIDE 4-CHLOROPHENOXYACETIC ACID NANOCOMPOSITE**

Layered double hydroxide (LDH)-based nanohybrid, created by interacting LDH nanocomposite with another nanoparticles, are come out in active area for environmental protection, healthcare, and storage of drugs or herbicides. In this study, Herbicides, 4-chlorophenoxyacetic acid were intercalated into MgAl-layered double hydroxide (LDH) by using molar ratio 2 ( $R=2$ ). It is synthesised via co-precipitation method at pH 10 ( $\pm 0.5$ ). The intercalation compound (MgAl-4CPA), was characterised using PXRD and FTIR-ATR to confirm that guest anion are successfully intercalated into MgAl-LDH nanohybrids. The XRD pattern shows that at concentration 0.7 M, the basal spacing shift from 8.9 Å to 9.3 Å, which means the guest anion was successfully intercalated. The result supported by the FTIR-ATR spectrum that shows nitrate peak at wavenumber  $1353.50\text{ cm}^{-1}$  disappeared and carboxylate ion ( $\text{COO}^-$ ) band presence at wavenumber  $1596.29\text{ cm}^{-1}$ . Meanwhile, the controlled release study of 4CPA from MgAl-LDH nanohybrids shows that carbonate aqueous salt solution released the percentage of 4CPA higher than tap water, which are 19.72 and 18.92 %, respectively. This study offered that controlled release of 4CPA from LDH can created safer agent of agrochemicals that can be used in agricultural fields.